ABSTRACT

Dielectric materials having modified dielectric constants and methods for modifying the dielectric constant of a dielectric material are provided. Generally, the dielectric constant of a dielectric material is modified by providing relieved portions within the dielectric material. The relieved portions may comprise holes formed in the dielectric material. In connection with dielectric material that is incorporated into an antenna apparatus, the size and/or arrangement of holes or other relieved portions in the dielectric material can be determined with reference to the operating wavelengths of the antenna apparatus. ~~A dual band coplanar microstrip interlaced array antenna is provided. The antenna may be confined to a relatively small area, while providing dual band operation with no or minimal grating lobes and losses. According to the present invention, first and second arrays are interlaced with one another to minimize the surface area of the antenna. A maximum spacing between array elements is selected based on the operating wavelengths and scan range for each of the arrays. A first dielectric constant of a material underlying elements of the first array is calculated from the selected element spacing and the operating wavelength of the first array. A second dielectric constant of a material underlying elements of the second array is calculated from the first dielectric constant and the operating frequencies of the first and second arrays. The present invention provides a dual band coplanar microstrip interlaced array antenna capable of efficient operation at two center frequencies. A material having a modified effective dielectric constant and a method for modifying the effective dielectric constant of a material are also provided.~~

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